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10/594,444	09/26/2006	Kenichi Maruhashi	Q97384	6862

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EXAMINER
WANG-HURST, KATHY W

ART UNIT	PAPER NUMBER
2617	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/594,444	MARUHASHI ET AL.	
	Examiner	Art Unit	
	KATHY WANG-HURST	2617	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 April 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *26-38,41-44 and 49-53* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *26-38,41-44 and 49-53* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 4/16/2010 has been entered.

Response to Amendment

1. Claims 26-38, 41-44, and 49-53 are all the claims pending in the application. By this Amendment, Applicants add new claims 52 and 53. Claims 22-25, 39, 40, 45, 46, and 48 have been canceled without prejudice or disclaimer.

Response to Arguments

2. Applicant's arguments filed 4/16/2010 have been fully considered but they are not persuasive.

Regarding the applicant's argument that prior art of record does not teach or suggest instructing symbol rate setting means to set a high symbol rate or low symbol rate in said modulating means and said demodulating means based on the detected propagating state of radio waves (page 20), the examiner respectfully disagrees. Ling discusses, in many instances, the above limitation. For example, Ling discusses data rates are set low when the SNR is low ([0026]), information bit rates vary along with time based on link conditions such that the processing can be adjusted accordingly

([0035]), the coding for each transmission channel may be adjusted such that the information bit rate matches the transmission capability supported by the channel SNR ([0133]). Ling also discusses the data rate associated with types of modulation scheme and additionally, the modulation scheme for the transmission channel may be selected based on the channel SNR ([0133]). Although Ling discusses changing data rate, modulation and coding based on propagating environment, Ling does not explicitly discuss changing symbol rate in relation to data/bit rate based on propagating environment. However, it is well known in the art that data rate is directly related to symbol rate. (See http://en.wikipedia.org/wiki/Symbol_rate for detailed information). In order to make it more obvious, Rappaport is brought to show changing symbol rate based on propagating environment. Therefore the combination of Ling and Rappaport does teach or suggest instructing symbol rate setting means to set a high symbol rate or low symbol rate in said modulating means and said demodulating means based on the detected propagating state of radio waves.

Regarding the applicant's argument the prior art of record fails to describe that radio devices have access to any "detected propagation state" (page 21), the examiner respectfully disagrees. First of all, the term "propagation state" is a very broad term which may be interpreted as any signal propagating environment such as multipath interference, error rate due to traffic congestion, SNR, etc. Secondly, Ling teaches varying data/bit rate based on the channel characteristics such as SNR, CSI, link conditions ([0026][0035][0133]). Thus the propagation state has to be detected and accessed by the devices, i.e. receivers and transmitters, in order to dynamically change

data rate. Therefore the prior art of record describes that its radio devices have access to any "detected propagation state".

Concerning the combination of references, all of the references are from the same field, i.e. communication systems and concern analogous topics. Therefore, the examiner contends that the references would be combinable to one skilled in the art.

Therefore, the argued limitations read upon the cited references or are written broad such that they read upon the cited references, as follow.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 26-31, 34, 38, 41-44, and 49-51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ling et al. (US 2004/0165558) in view of Rappaport (US 2004/0143428).

Regarding claims 26 and 49, Ling discloses a radio communications device ([0019]) comprising:

a transmitter (Fig. 1 and [0022]) comprising:

a plurality of transmission antennas for radiating radio waves based on transmission RF signals (Fig. 1 items 124A-124T);

a plurality of transmitting circuit means for supplying the transmission RF signals to said plurality of the transmission antennas, respectively, based on a plurality of transmission signals (Fig. 1 items 122a-122T, 120, 132 and 114 and [0022][0023]); and

transmission signal processing means comprising modulating means, for modulating input transmission data to generate said plurality of the transmission signals by using said modulating means ([0022][0023]), and for outputting the modulated plurality of the transmission signals to said plurality of the transmitting circuit means ([0022][0023]);

a receiver (Fig. 1) comprising:

a plurality of reception antennas for receiving the radio waves transmitted by the plurality of the transmission antennas and outputting reception RF signals based on the received radio waves (Fig. 1 items 152A-152R);

a plurality of receiving circuit means for outputting reception signals based on said reception RF signals output respectively from by said plurality of the reception antennas (see e.g. Fig. 1 item 154A-154R, 156, 162 and 158 and [0034][0035]); and

reception signal processing means comprising demodulating means([0034]), for demodulating the reception signals output respectively from said plurality of the receiving circuit means by using said demodulating means to generate reception data ([0034][0035]);

propagation detecting means for detecting a propagating state of said radio waves received by said plurality of the reception antennas ([0022]-[0023]);

coding and modulation schemes setting means for selecting a coding and modulation scheme ([0031][0035][0040]), to be used during modulation and demodulation, from a plurality of coding and modulation schemes based on the detected propagating state ([0035][0041]), and for setting the selected coding and modulation schemes in said modulating means and said demodulating means; and

control means for instructing said symbol rate setting means to set a high symbol rate or a low symbol rate in said modulating means and said demodulating means based on the propagating state detected by said propagation detecting means ([0026][0035][0133] data rates can be changed to high or low based on propagating environment).

Ling discloses setting and selecting coding and modulation schemes based on the detected propagating state but does not explicitly disclose setting and selecting symbol rate based on the detected propagating state. However, it is known in the art that coding rate and modulation schemes are directly related to the symbol rate.

In an analogous art, Rappaport teaches setting and selecting symbol rate based on the detected propagating state ([0045]).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the invention of Ling, to adjust various settings such as symbol rates to achieve identified performance goals for the communication network, as taught by Rappaport, thus facilitating the automated determination of desirable configuration setting for the wireless transceivers ([0045]).

Regarding claim 28, Ling discloses a radio communications device comprising:

a transmitter (Fig. 1 and [0022]) comprising:

a plurality of transmission antennas for radiating radio waves based on transmission RF signals (Fig. 1 items 124A-124T);

a plurality of transmitting circuit means for supplying the transmission RF signals to said plurality of the transmission antennas, respectively, based on a plurality of transmission signals (Fig. 1 items 122a-122T, 120, 132 and 114 and [0022][0023]); and

transmission signal processing means comprising a plurality of modulating means having respective different modulating schemes ([0040][0041]), for modulating input transmission data to generate said plurality of the transmission signals by using a selected one of said plurality of the modulating means ([0040][0041]), and for outputting the transmission signals to said transmitting circuit means ([0040][0041]);

a receiver (Fig. 1) comprising:

a plurality of reception antennas for receiving the radio waves transmitted by the plurality of the transmission antennas and outputting reception RF signals based on the received radio waves (Fig. 1 items 152A-152R);

a plurality of receiving circuit means for outputting reception signals based on said reception RF signals output respectively from by said plurality of the reception antennas (see e.g. Fig. 1 item 154A-154R, 156, 162 and 158 and [0034][0035]); and

reception signal processing means having a plurality of demodulating means comprising respective different demodulation schemes ([0021]), for demodulating the reception signals output respectively by said plurality of the receiving circuit means by

using a selected one of said plurality of the demodulating means to generate reception data ([0034][0070]);

propagation detecting means for detecting a propagating state of said received radio waves ([0022][0023]); and

modulating means/demodulating means selecting means for selecting one of said modulating means and one of said demodulating means for modulating the input transmission data and for demodulating the reception signals, respectively ([0030][0031][0035][0040]), based on the detected propagating state ([0023][0031]).

control means for instructing said symbol rate setting means to set a high symbol rate or a low symbol rate in said modulating means and said demodulating means based on the propagating state detected by said propagation detecting means ([0026][0035][0133] data rates can be changed to high or low based on propagating environment).

Ling discusses symbols and data rates ([0012][0026]) but does not explicitly disclose symbol rates.

In an analogous art, Rappaport teaches setting and selecting symbol rate based on the detected propagating state ([0045]).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the invention of Ling, to adjust various settings such as symbol rates to achieve identified performance goals for the communication network, as taught by Rappaport, thus facilitating the automated determination of desirable configuration setting for the wireless transceivers ([0045]).

Regarding claim 51, Ling discloses a radio communication device comprising:

a plurality of modulating means for modulating transmission data to generate a plurality of transmission signals ([0022][0023][0030][0031] modulation means);

a plurality of transmission means for supplying, based on said plurality of transmission signals, transmission RF signals to a plurality of transmission antennas, wherein said plurality of transmission antennas radiate radio waves based on the transmission RF signals ([0032][0033][0035] transmission means); and

a plurality of demodulating means for demodulating reception signals based on reception RF signals output from reception antennas that have received the radio waves from the plurality of the transmission antennas, to generate reception data, wherein the reception antennas output the reception RF signals based on the received radio waves ([0034][0070][0071] demodulating means),

propagation detecting means for detecting a propagating state of said received radio waves ([0030][0035]); and

control means for selecting, based on the propagating state detected by said propagation detecting means, modulating means, among the plurality of the modulating means, and demodulating means, among the plurality of the demodulating means, which have a high symbol rate or for selecting, based on the propagating state detected by said propagation detecting means, modulating means, among the plurality of the modulating means, and demodulating means, among the plurality of the demodulating means, which have a low symbol rate ([0035][0040][0041]),

wherein a first symbol rate in said plurality of modulating means and a second symbol rate in said plurality of demodulating means are set based on an intensity of the multipath interference which is determined based on a propagating state of the radio waves ([0006][0035][0060] multipath causing degradation of the propagating signals and adjusting transmission rate based on propagating state).

Ling discusses symbols and data rates ([0012][0026]) but does not explicitly disclose symbol rates.

In an analogous art, Rappaport teaches setting and selecting symbol rate based on the detected propagating state ([0045]).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the invention of Ling, to adjust various settings such as symbol rates to achieve identified performance goals for the communication network, as taught by Rappaport, thus facilitating the automated determination of desirable configuration setting for the wireless transceivers ([0045]).

Regarding claims 27 and 29 and 34, Ling discloses adjusting data processing parameters such as code and modulation schemes due to multipath effects ([0035]).

Regarding claims 30 and 31, combination of Ling and Rappaport discloses adjusting modulation schemes in order to increase or decrease symbol rates.

Regarding claim 37, Ling discloses the radio communications device according to claim 34, wherein said control means instructs said modulating means and said demodulating means to select any one of modulating and demodulating processes including ASK, BPSK, FSK, QPSK, and DQPSK ([0040][0041]) and to use one of said

plurality of transmitting circuit means and one of said plurality of receiving circuit means, respectively, when it is determined that the interference is weak (noise is low from SNR), and instructs said modulating means and said demodulating means to select either of modulating and demodulating processes including multivalued PSK and multivalued QAM and to use said plurality of transmitting circuit means and said plurality of receiving circuit means, respectively, when it is determined that the interference is strong (noise is high from SNR) ([0021][0022]).

Claim 41 is rejected on the same grounds as claim 26.

Claim 42 is rejected on the same grounds as claim 26.

Claim 43 is rejected on the same grounds as claim 28.

Claim 44 is rejected on the same grounds as claim 28.

Claim 50 is rejected on the same grounds as claim 26.

3. Claims 32, 33 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ling, in view of Rappaport, further in view of Kadous et al. (US 2005/0075073).

Regarding claims 32, 33 and 38, combination of Ling and Rappaport discloses varying data transmission rate based on channel condition but fails to disclose varying the number of transmitting circuit means used according to the channel condition.

Kadous teaches varying the number of transmitting circuit means used according to the channel condition ([0009]).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the invention of Ling in view of Rappaport,

to turn off transmit antennas depending on the data rate, as taught by Kadous, thus reducing interference by turning off the undesirable transmit means ([0009]).

4. Claims 35, 36, 52 and 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ling in view of Rappaport, further in view of Ashby (US 5861781).

Regarding claims 35 and 52, Ling discloses a radio communications device ([0019]) comprising:

a transmitter (Fig. 1 and [0022]) comprising:

a plurality of transmission antennas for radiating radio waves based on transmission RF signals (Fig. 1 items 124A-124T);

a plurality of transmitting circuit means for supplying the transmission RF signals to said plurality of the transmission antennas, respectively, based on a plurality of transmission signals (Fig. 1 items 122a-122T, 120, 132 and 114 and [0022][0023]); and

transmission signal processing means comprising modulating means, for modulating input transmission data to generate said plurality of the transmission signals by using said modulating means ([0022][0023]), and for outputting the modulated plurality of the transmission signals to said plurality of the transmitting circuit means ([0022][0023]);

a receiver (Fig. 1) comprising:

a plurality of reception antennas for receiving the radio waves transmitted by the plurality of the transmission antennas and outputting reception RF signals based on the received radio waves (Fig. 1 items 152A-152R);

a plurality of receiving circuit means for outputting reception signals based on said reception RF signals output respectively from by said plurality of the reception antennas (see e.g. Fig. 1 item 154A-154R, 156, 162 and 158 and [0034][0035]); and

reception signal processing means comprising demodulating means([0034]), for demodulating the reception signals output respectively from said plurality of the receiving circuit means by using said demodulating means to generate reception data ([0034][0035]);

propagation detecting means for detecting a propagating state of said radio waves received by said plurality of the reception antennas ([0022]-[0023]);

coding and modulation schemes setting means for selecting a coding and modulation scheme ([0031][0035][0040]), to be used during modulation and demodulation, from a plurality of coding and modulation schemes based on the detected propagating state ([0035][0041]), and for setting the selected coding and modulation schemes in said modulating means and said demodulating means.

Ling discloses setting and selecting coding and modulation schemes based on the detected propagating state but does not explicitly disclose setting and selecting symbol rate based on the detected propagating state. However, it is known in the art that coding rate and modulation schemes are directly related to the symbol rate.

In an analogous art, Rappaport teaches setting and selecting symbol rate based on the detected propagating state ([0045]).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the invention of Ling, to adjust various

settings such as symbol rates to achieve identified performance goals for the communication network, as taught by Rappaport, thus facilitating the automated determination of desirable configuration setting for the wireless transceivers ([0045]).

Ling in view of Rappaport discloses varying modulation and demodulation schemes to achieve optimal performance, but fails to disclose employing direct or indirect modulation to achieve optimal performance.

In an analogous art, Ashby teaches employing direct or indirect modulation to achieve optimal performance (col. 1 lines 24-45, choosing indirect modulation over direction modulation; and col. 2 lines 44-55; col. 4 lines 29-43).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the invention of Ling in view of Rappaport, to apply different modulation mechanisms to process the signals, as taught by Ashby, thus improving the accuracy of the phase shift (col. 1, lines 24-45).

Regarding claims 36 and 53, the combination of Ling, Rappaport and Ashby teaches applying direct or indirect modulations based on propagating environment.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KATHY WANG-HURST whose telephone number is (571) 270-5371. The examiner can normally be reached on Monday-Thursday, 7:30am-5pm, alternate Fridays, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nick Corsaro can be reached on (571) 272-7876. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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